



Digital Engineering Update

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<https://www.CTO.mil>

 @DoDCTO

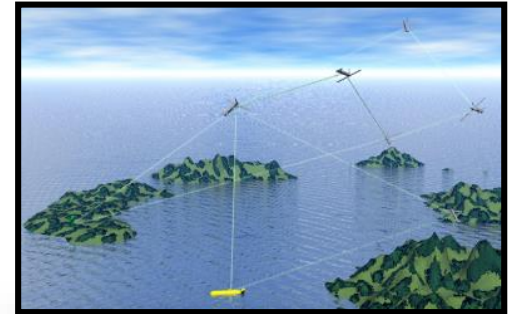


USD(R&E) Mission



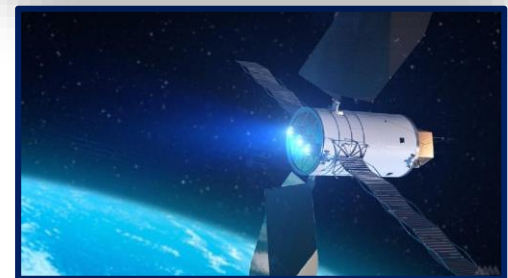
■ Ensure Technological Superiority for the U.S. Military

- Set the technical direction for the Department of Defense (DoD)
- Champion and pursue new capabilities, concepts, and prototyping activities throughout the DoD research and development enterprise



■ Bolster Modernization

- Pilot new acquisition pathways and concepts of operation
- Accelerate capabilities to the Warfighter



“Our mission is to ensure that we, if necessary, reestablish and then maintain our technical advantage.”

– Under Secretary Griffin, April 2018



Modernization Priorities



“We cannot expect success fighting tomorrow’s conflicts with yesterday’s weapons or equipment.”

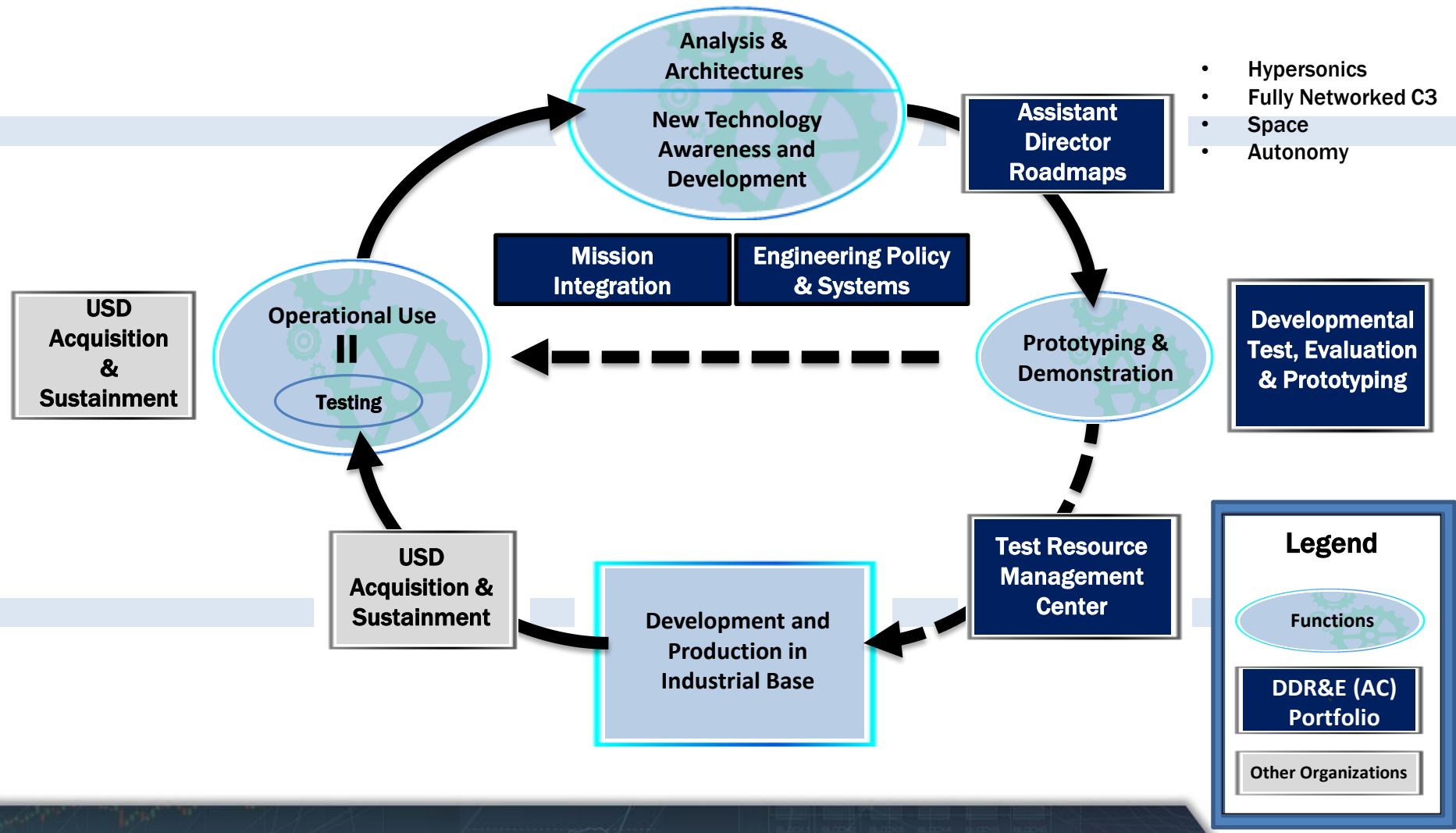
– National Defense Strategy

- 5G
- Autonomy
- Biotechnology
- Cyber
- Directed Energy
- Fully Networked Command, Control, and Communications
- Hypersonics
- Machine Learning / Artificial Intelligence
- Microelectronics
- Quantum Science
- Space

For each modernization priority, a Portfolio Manager (Assistant Director) is responsible for establishing the DoD-wide, mission-focused strategy and execution plan.



DDRE Advanced Capabilities High-Level Development Cycle





Digital Engineering Strategy Overview



Digital Engineering Strategy

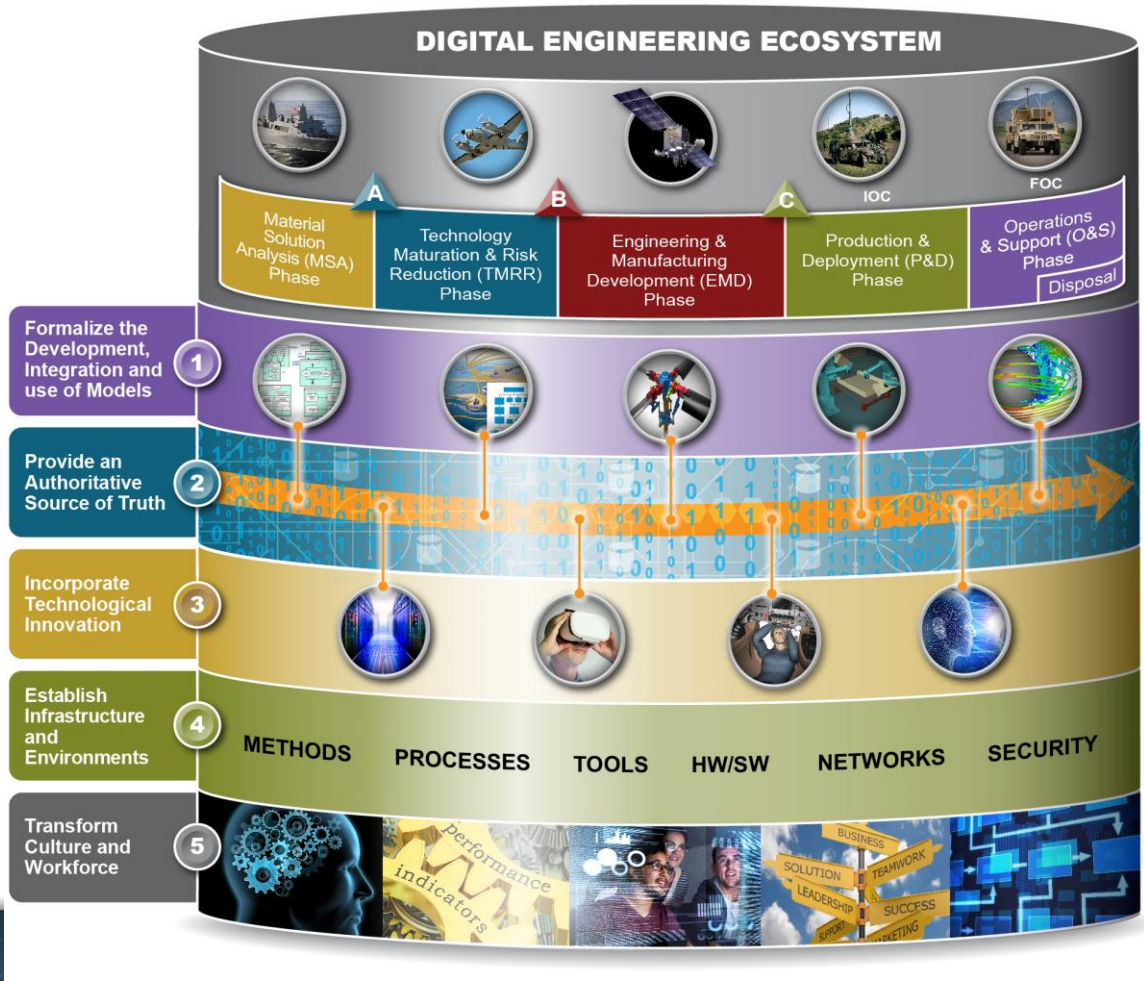
- Modernizes how we design, operate, and sustain capabilities to outpace our adversaries
- Released June 2018

Objective

- Sets the vision across 5 goals
- Guides the planning, development, and implementation

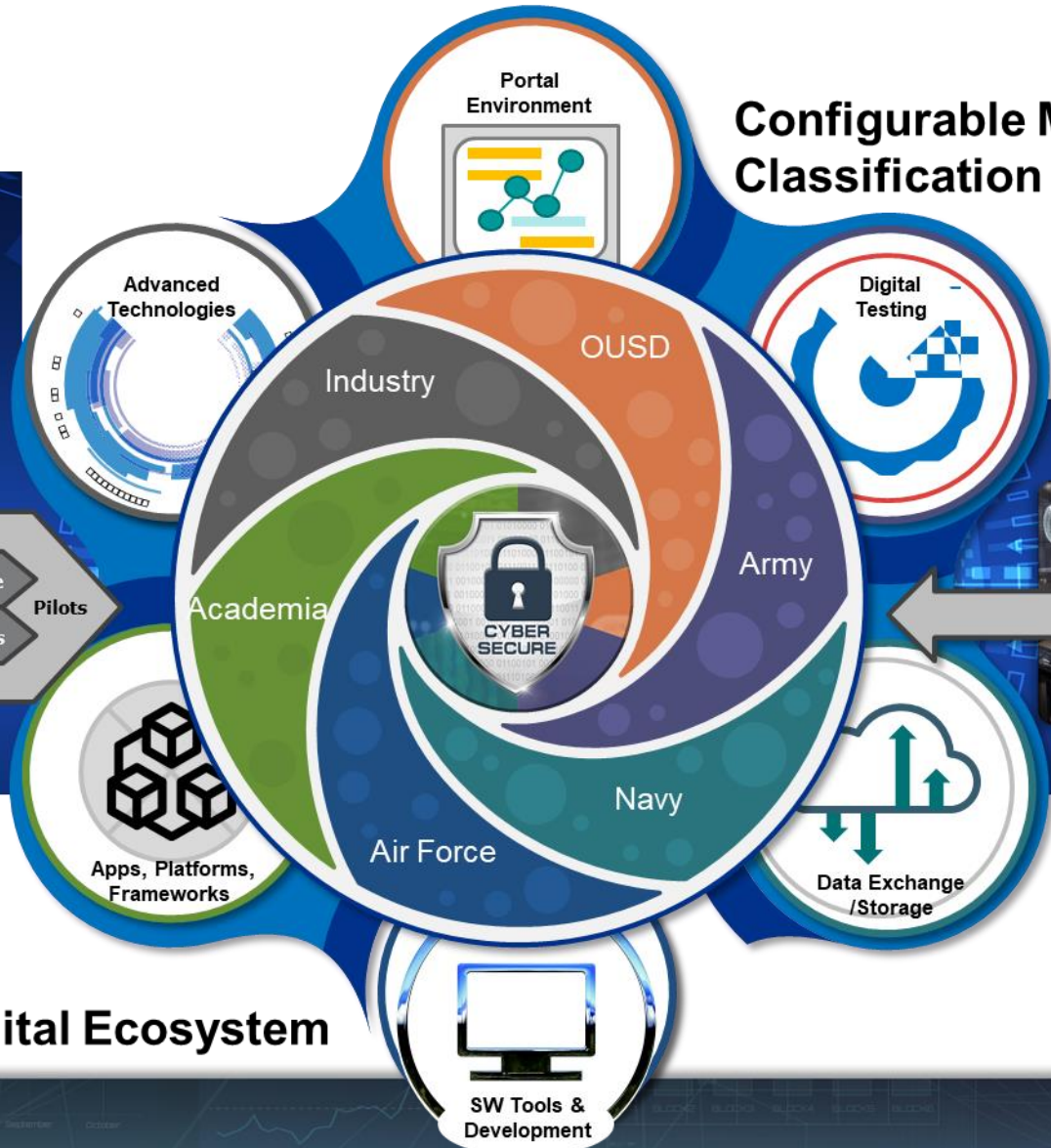
Expected Impact

- Reforms the Department's business practices for greater performance and agility





Digital Engineering Core Capabilities



Configurable Multi-User & Classification Environment

The Future



Strategic Alignment

Digitally Enabled Capabilities

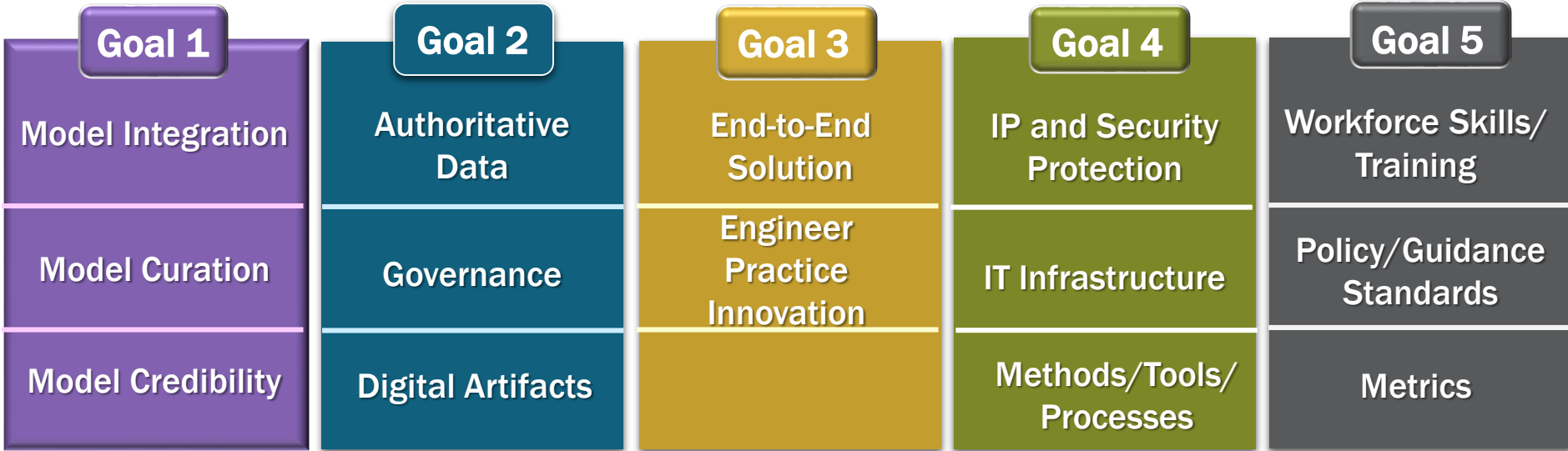
Shared Digital Ecosystem



Digital Engineering Implementation



Identified cross-Service Challenges for each DE Strategy Goal



| Topic | Short Description |
|-------------------|--|
| Model Integration | Models are not developed or used across domains, acquisition phases, and programs. |
| Model Curation | Models are not curated such that information can be preserved, discovered and used across the lifecycle. |
| Model Credibility | Traditional VV&A approaches do not account for model credibility and trust in the digital age. |

Models

| Topic | Short Description |
|--------------------|---|
| Authoritative Data | Vast amounts of data are scattered across multiple stove-piped systems and organizations in various forms |
| Governance | Managing and controlling data sources are fragmented or ad hoc |
| Digital Artifacts | Exchanging digital artifacts in a document-based culture |

Authoritative Data

| Topic | Short Description |
|---------------------------------|---|
| End-to-End Solutions | Digital engineering activities are disjointed across the lifecycle |
| Engineering Practice Innovation | Transforming the way engineers leverage technology to be responsive to change |

Technological Innovation

| Topic | Short Description |
|-------------------------------------|---|
| IP & Critical Technology Protection | Limited strategies for protecting and securing the integrity of classified and proprietary digital data |
| IT Infrastructure | IT infrastructures not designed for complex digital model-based engineering activities |
| Methods, Tools, & Processes | Current methods process and tools do not holistically support the digital engineering activities |

Supporting Infrastructure

| Topic | Short Description |
|-------------------------------|--|
| Workforce Skills Training | Limited incentives workforce skills, insufficient training capacity and resources to meet the demand |
| Policy, Guidance, & Standards | Limited policies, guidance, and standards to comprehensively address digital engineering activities |
| Metrics | Lack of a common set of metrics that serve as leading indicators of adoption and effectiveness |

Culture and Workforce



Digital Engineering Information Exchange Working Group



A Standardized way to Offer, Request and Exchange Digital Artifacts

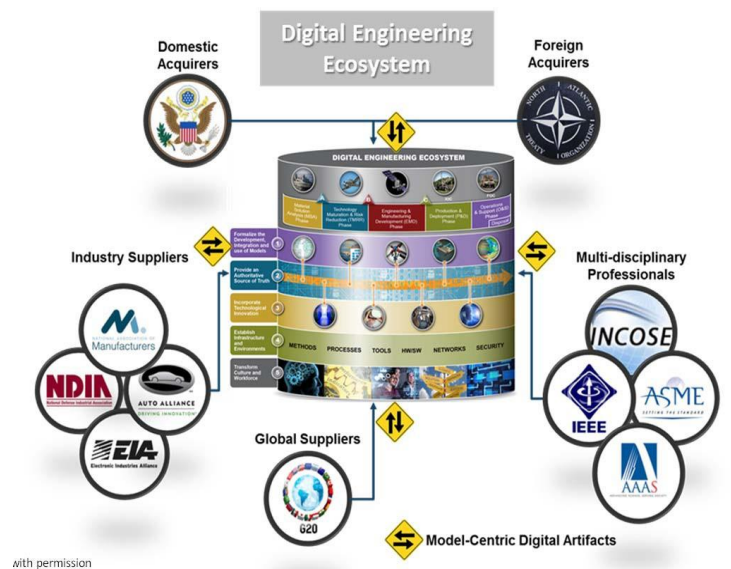
Products

- **DEIXPedia:** Micropedia of digital engineering topics to explain relevant DEIX topics. **STATUS: In place and Maintaining.** See link below
- **Primer:** A narrative that describes the concepts and interrelationships between digital artifacts, enabling systems, and exchange transactions **STATUS: In Process, DRAFT planned for IS2020**
- **Digital Engineering Information Exchange Model (DEIXM):** A prescriptive system model for exchanging digital artifacts in an engineering ecosystem **STATUS: In process, DRAFT planned for IS2020**
- **Digital Viewpoint Models (DVM):** Descriptive information models of digital views that form content for ISO 15288.2 reviews **STATUS: DRAFT DVM developed, working with TIMLM on DEIX challenge to Validate at IS2020**
- **DEIX Standards Framework (DEIX-SF):** A framework for official standards related to MBE Information Exchanges **STATUS: DRAFT DEIX-SF DRAFT developed, use in challenge**

Contributing Team:

- Dr. John Coleman, SAIC, (Chairperson)
- Chris Schreiber, Lockheed Martin (Co-Chair)
- Frank Salvatore, SAIC (Co-Chair)
- Tamara Hambrick, Northrop Grumman
- Sean McGervey, JHUAPL
- Celia Tseng, Raytheon
- Russell Peak, GTRI
- Mark Blackburn, Stevens
- Terri Chan, Boeing
- Ken Zhang, L3 Harris
- Gan Wang, BAE Systems
- Mike Vinarcik, SAIC
- Mary Tolbert, MITRE

Information Exchange Model for Digital Engineering Ecosystem



For more details see the Digital Engineering Information Exchange Working Group (DEIX WG) WIKI page at:

<http://www.omgwiki.org/MBSE/doku.php?id=mbse:deix>



Summary



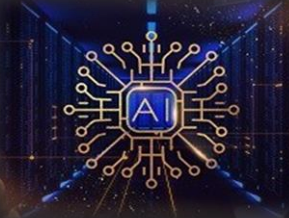
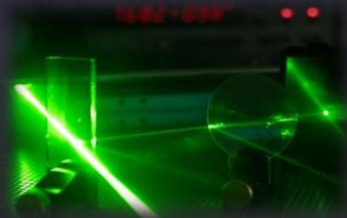
- **OSD has transitioned from the Strategy to Implementation**
- **Digital Engineering core capabilities are an enabler to execute the R&E mission and priorities**
- **OSD has begun to drill down on the challenges, and developed common pain points to solve across the Services**
- **DEIXWG continues to make great progress**
- **We will capture INCOSE input on pain points at 1:00 workshop**



DoD Research and Engineering Enterprise



Creating the Technologies of the Future Fight



DoD Research and Engineering Enterprise

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For Additional Information



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